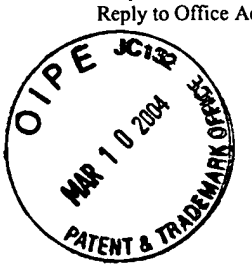

PATENT APPLICATION
Docket No. 15436.247.45.1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Jeffery D. Walker, et al.	
Serial No.:	10/014,679	Art Unit 3663
Filed:	December 11, 2001	
Confirmation No.:	3207	
For:	INTEGRATED OPTICAL DEVICE INCLUDING A VERTICAL LASING SEMICONDUCTOR OPTICAL AMPLIFIER	
Customer No.:	Customer No. 022913	
Examiner:	Mark Hellner	

RESPONSE "A" UNDER 37 C.F.R. § 1.111

Mail Stop AMENDMENT – **FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Office Action mailed September 10, 2003, Applicants respectfully request reconsideration and allowance for the above-identified application. Claims 1-34 remain pending.

Initially, Applicants note with appreciation the Examiner's indication that claims 16-22 and 32-34 are allowed. Applicants further note with appreciation the Examiner's indication that claims 2-4, 6-15, and 25-31 contain allowable subject matter and are merely objected to as being

dependent upon a rejected base claim. Finally, Applicants note with appreciation the Examiner's consideration of the documents cited in the Information Disclosure Statement filed on May 7, 2002.

The Office Action objects to the drawings as being informal. Accordingly, as requested by the Office Action, attached hereto is a submission of formal drawings.

Claims 1, 5, 23, and 24 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 5,436,759 to Dijaili, et al. ("Dijaili"). Applicants respectfully traverse this ground of rejection.

The present invention relates to integrating vertically lasing semi-conductor optical amplifiers ("VLSOAs") with other optical elements on a common substrate and to methods for fabricating such integrated optical devices. Integrated optics is a term which is sometimes used to refer to the concept of an optical equivalent to the electronic integrated circuits, in which many electrical elements are integrated onto a common substrate. Current-day optical amplifiers, however, are not suited to play an analogous role with respect to integrated electronic circuits. For example, fiber amplifiers are inherently too large to be useful in an integrated optics package. Similarly, semi-conductor optical amplifiers ("SOAs") suffer from the same drawbacks as fiber amplifiers: large size and labor-intensive manufacturing process. Furthermore, in electronic-integrated circuits, the various components are built up from a handful of basic building blocks: transistors, diodes, interconnects, etc. This is not the case, however, for optical integrated circuits. Typical SOAs are very different in design from waveguides, sources, modulators, detectors, etc. The optical elements required to build up more complex systems typically are not based on a handful of common building blocks and often even require

the use of different materials. Accordingly, integrating these devices onto a common substrate to form an integrated transmitter is not straightforward.

The present invention overcomes the above deficiencies of current optical systems by integrating VLSOAs and other optical elements onto a common substrate. The optical element may be any number of structures such as a passive optical waveguide or an active optical device (*e.g.*, another VLSOA). In one approach, the VLSOA and optical element are formed on a common substrate using a common fabrication process, but with at least one parameter varying between the VLSOA and the optical element. Alternatively, the VLSOA and the optical element may be formed on a common substrate using different fabrication processes.

Claim 1 is directed towards at least a portion of the aforementioned embodiments of the present invention and recites an integrated optical device comprising a vertical lasing semi-conductor optical amplifier ("VLSOA") and an optical element. Claim 1 further recites, *inter alia*, a portion of the VLSOA and a portion of the optical element are formed on a common substrate by a common fabrication process. At least one parameter varies between the portion of the VLSOA and the portion of the optical element.

Applicants respectfully submit that claim 1 is not anticipated by Dijaili for at least the reason that Dijaili does not disclose each and every element claimed. For instance, Dijaili does not teach an integrated optical device comprising a VLSOA and an optical element, wherein a portion of the VLSOA and a portion of the optical element are formed on a common substrate. Further, Dijaili does not disclose that the integrated optical device, as recited in claim 1, is formed by a common fabrication process. Moreover, Dijaili does not disclose that at least one parameter varies between the portion of the VLSOA and the portion of the optical element.

Dijaili discloses a low-noise optical amplifier that solves cross talk problems of typical optical amplifiers by using an optical cavity oriented off-axis (*e.g.*, perpendicular) to the direction of a signal amplified by the game medium of the optical amplifier. Dijaili, however, is silent with respect to integrated optical devices. As such, Dijaili does not disclose and integrated optical device comprising a VLSOA and an optical element, wherein a portion of the VLSOA and a portion of the optical element are formed on a common substrate, as recited, *inter alia*, in claim 1. Further, Dijaili does not teach that the integrated optical device is formed by a common fabrication process, nor does Dijaili disclose that at least one parameter varies between the portion of the VLSOA and the portion of the optical element.

Nevertheless, the Office Action relies on Figure 5 of Dijaili as allegedly teaching all of the elements of claim 1. In particular, the Office Action alleges that Figure 5 discloses an optical amplifier that comprises, among other things, a passive optical element (512) formed on a common substrate with a vertical cavity laser. Column 10, lines 56-58, states that the alleged optical element 512 is actually a "defraction region" within the optical amplifier shown in Figure 5, which serves as the segmenting function needed by Dijaili's optical amplifier to suppress the parasitic lasing modes. Because, as acknowledged by the Office Action, the defraction region 512 is a part of the optical amplifier shown in Figure 5, Dijaili does not teach an integrated optical device comprising a VLSOA and an optical element, wherein a portion of the VLSOA and a portion of the optical element are formed on a common substrate. In fact, the Office Action has failed to indicate which elements of the optical amplifier in Figure 5 correspond with the common substrate of claim 1. Accordingly, if this ground of rejection is maintained, Applicants respectfully request that the Examiner specifically point out, by column and line number, where Dijaili teaches an integrated optical device with a VLSOA and an optical

element, wherein a portion of the VLSOA and a portion of the optical element are formed on a common substrate.

In any event, because Dijaili does not disclose an integrated optical device comprising a VLSOA and an optical element, wherein a portion of the VLSOA and a portion of the optical element are formed on a common substrate, Dijaili does not disclose the integrated optical device is formed by a common fabrication process, nor does Dijaili disclose at least one parameter varies between the portion of the VLSOA and the portion of the optical element. In fact, Applicants respectfully note that the Office Action fails to show where Dijaili discloses these elements. As such, if this ground of rejection is maintained, Applicants respectfully request that the Examiner point out, by column and line number, where Dijaili teaches the aforementioned elements.

Because Dijaili does not disclose each and every element of claim 1, and because the Office Action has not shown where Dijaili discloses these elements, Dijaili does not anticipate claim 1.

Claim 23 recites a method for making an integrated optical device comprising forming a VLSOA on a substrate and forming an optical element on the substrate. As mentioned above with regard to claim 1, Dijaili does not disclose an integrated optical device comprising a VLSOA and an optical element that are formed on the same substrate. Accordingly, Dijaili cannot possibly disclose a method for making such an integrated optical device. As such, Applicants respectfully submit that Dijaili does not anticipate Claim 23 for at least those reasons stated above with regard to claim 1.

Claims 5 and 24 depend from claims 1 and 23, respectively, and are therefore patentably distinguishable over Dijaili for at least those reasons stated above with regard to claims 1 and 23.

For at least those reasons stated above, it is respectfully requested that the rejection of claims 1, 5, 23, and 24 as allegedly being anticipated by Dijaili be withdrawn.

All of the objections and rejections raised in the Office Action having been addressed, Applicants respectfully submit that the present application is in condition for allowance and earnestly solicit a Notice to that effect. Should the Examiner have any questions or concerns regarding this response, or the application in general, the Examiner is urged to contact the undersigned attorney.

Respectfully submitted,

Date: March 10, 2004

By: _____

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